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Technical manual
F400 cradle

Merlin Gerin
Modicon
Square D
Telemecanique

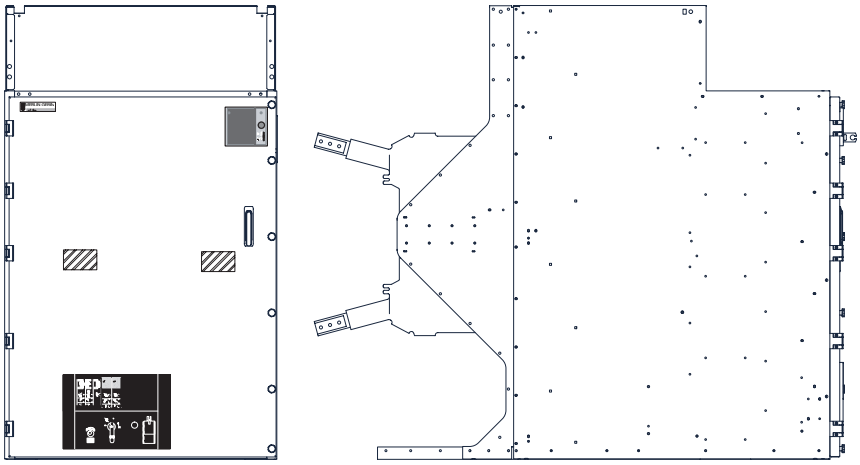
Schneider Electric

Contents

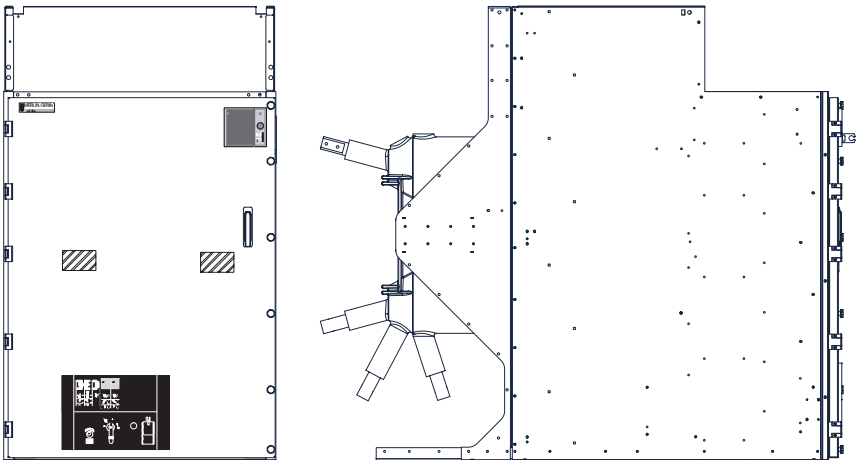
Contents

Cradle types

M1 cradle



M2 cradle



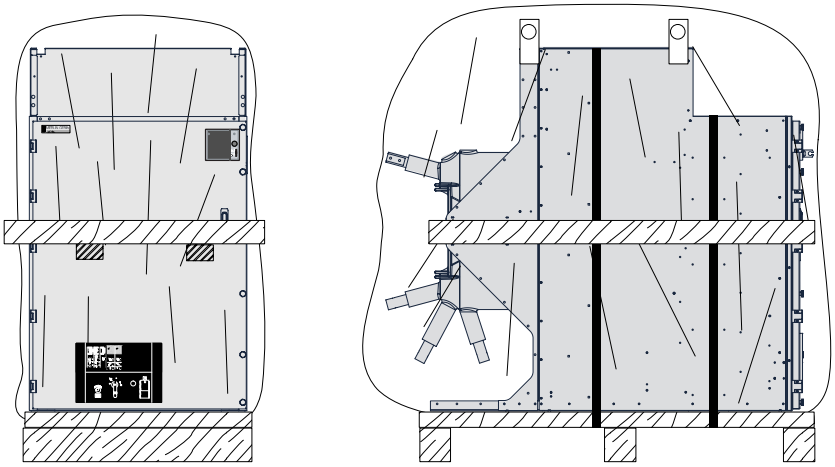
Dimensions	M1 cradles						M2 cradles					
	1250 A	1250 A	2500 A	2500 A	3000 A	3000 A	1250 A	1250 A	2500 A	2500 A	3000 A	3000 A
Width (cm)	118	127	118	127	118	127	118	127	118	127	118	127
Height (cm)	183.5	183.5	183.5	183.5	183.5	183.5	183.5	183.5	183.5	183.5	183.5	183.5
Depth (cm)	219	219	219	219	219	219	219	219	219	219	219	219
Weight (kg)	770	978	844	1052	864	1072	770	978	844	1052	864	1072
Packing type	2a	4c	2a	4c	2a	4c	2a	4c	2a	4c	2a	4c

the weight of cubicles includes the circuit-breaker weight

Packing

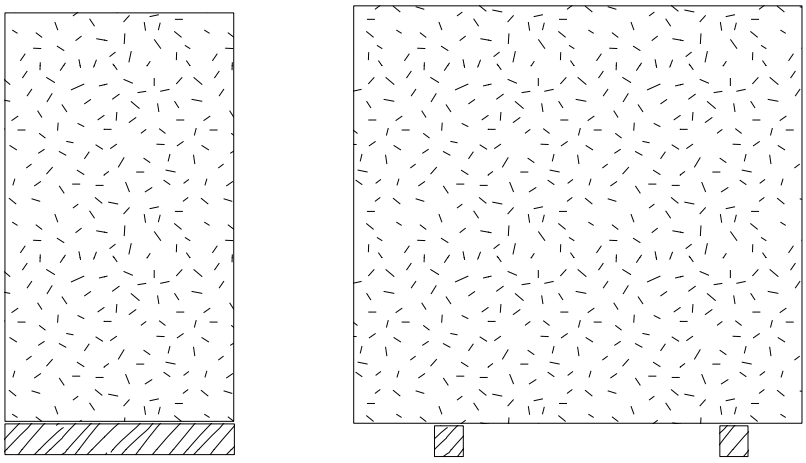
Overland transport packing (2a)

Functional unit



Sea transport packing (4c)

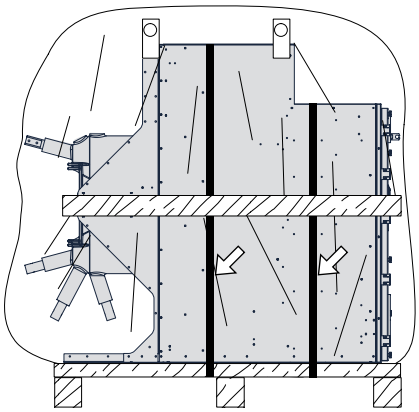
Functional unit

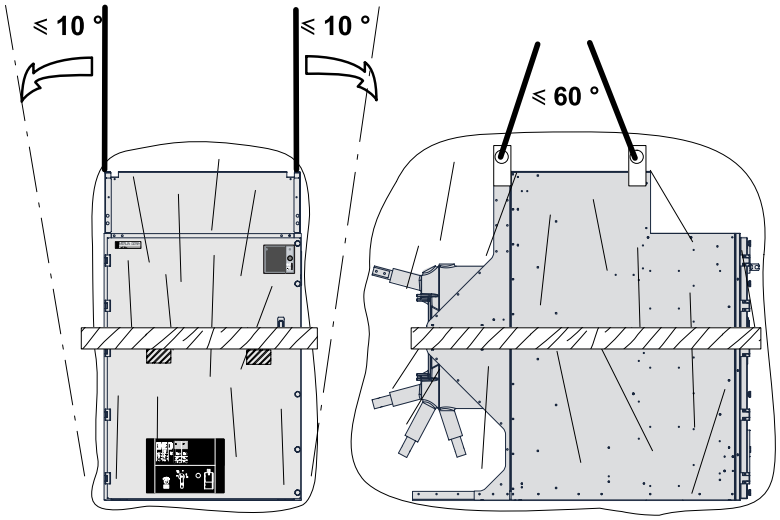


Handling by lifting

Functional unit

Remove the transport hoops.

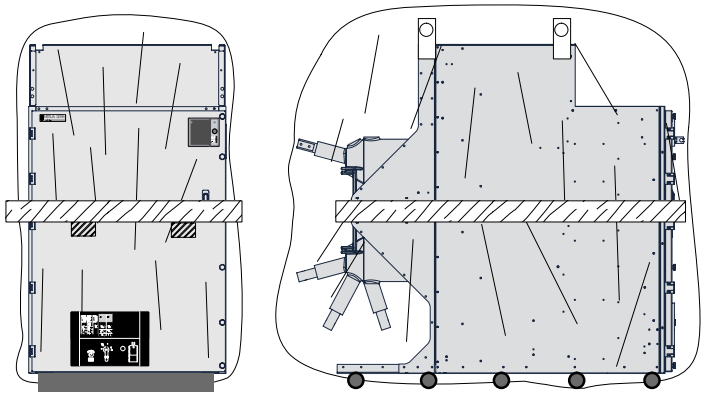




Sling up the device using the lifting lugs. Provide 2 m slings as a minimum.

The slings must not form an angle higher than 60°.
Cubicle gradient must not exceed 10°.

Handling by rolling

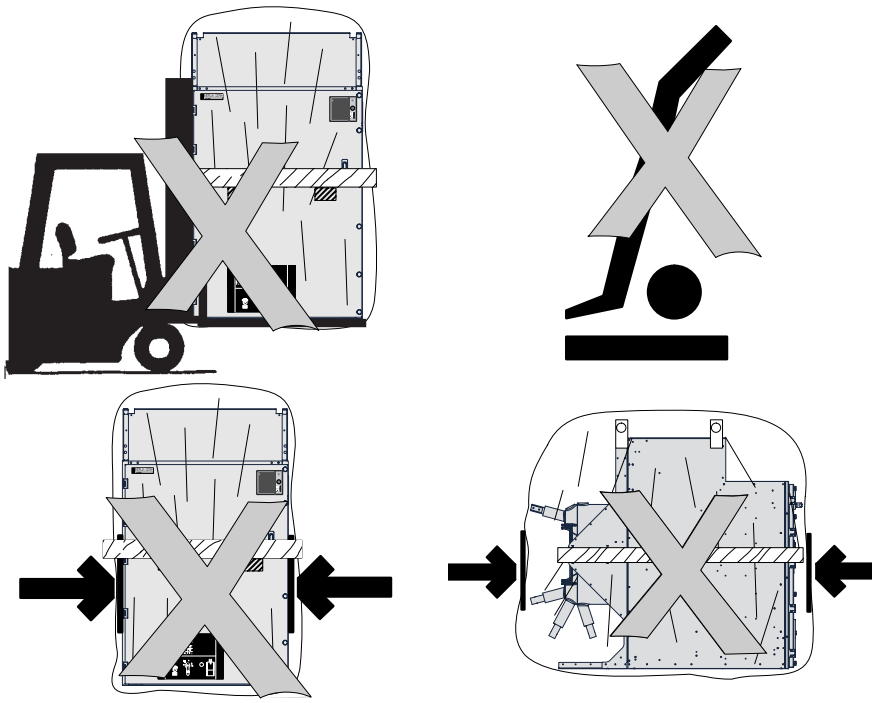


Proceed as shown opposite.

Be careful not to distort the cradle floor bearing surface.

Handling Instructions

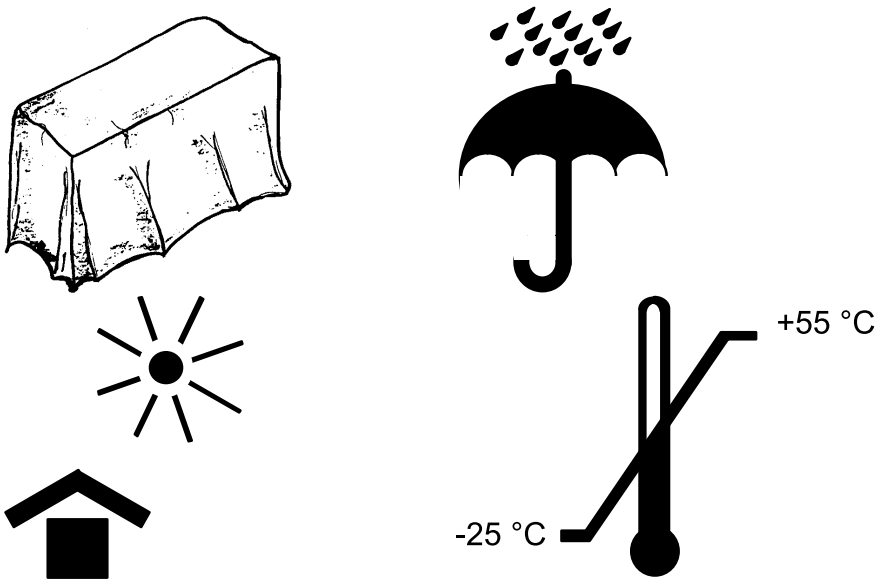
Handling by rolling



Storage

When stored, the equipment must remain in its original packing.

It must be placed on a dry floor or damp-insulating material.



Prolonged storage

For prolonged storage, the device must remain in its original packing.
After prolonged storage, care must be taken to thoroughly clean all insulating parts by means of a dry, clean cloth prior to use.

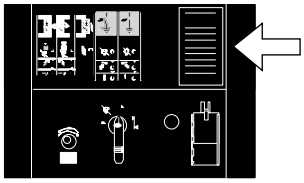
Handling Instructions

Unpacking the cradles

The cradles must be prepared in the room where they are going to be fitted.

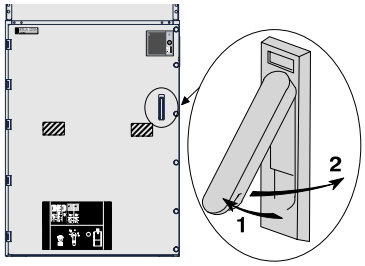
Avoid impacts and deformation.
Unpack the cradle by removing the wooden uprights and then the plastic cover.
Do not remove any component from the cradles.

Equipment identification



After unpacking, check that the features and descriptions marked on the cradle rating plates meet the requirement given in the contractual documents.

Removing the transportation devices from the removable part

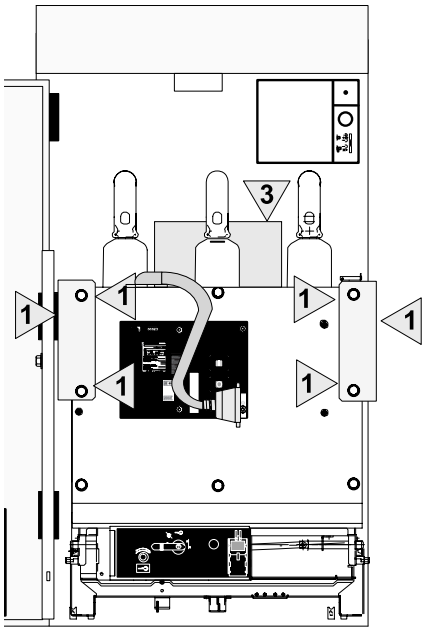


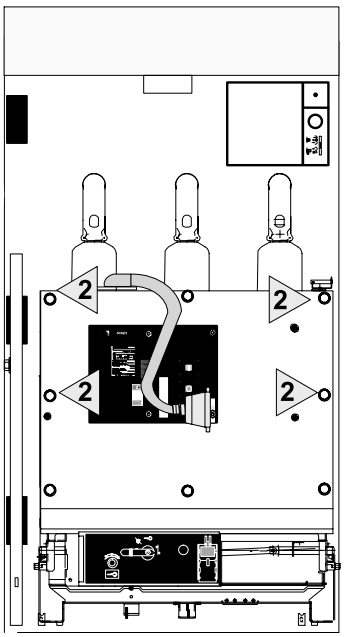
Open the access door to the removable part by pulling and then rotating the handle rightwards.

Operating instructions relating to the standard cradle

Note: *before sending the cradle back, fit the 2 reinforcements and their screws and bolts.*

1: Remove the 2 transport reinforcements (3 screws per reinforcement).
2: Fit the 4 mounting screws of the front plate and contact washers.
Tightening torque: 8.5 Nm.
3: Flap locking kit.

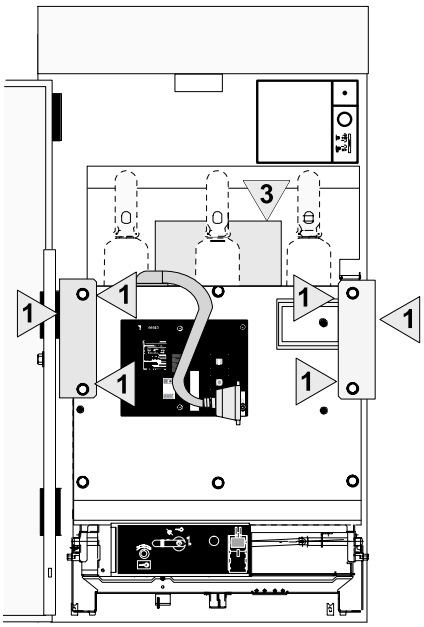


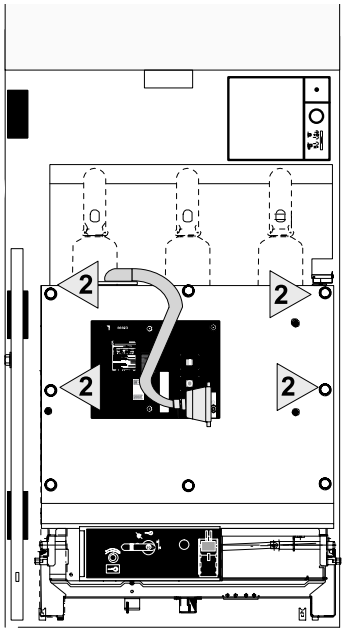


Operating instructions relating to the internal arc withstand cradle:

Note: *before sending the cradle back, fit the 2 reinforcements and their screws and bolts.*

1: Remove the 2 transport reinforcements (3 screws per reinforcement).
2: Fit the 4 screws used to fasten the front plate and contact washers contained in the bag of screws and bolts.
Tightening torque: 8.5 Nm.
3: Flap locking kit.





How to extract the removable part (front plate with black background)

To extract the removable part and close the door, refer to "**Operating Instructions**", section "**Operation**".

General description

Glossary

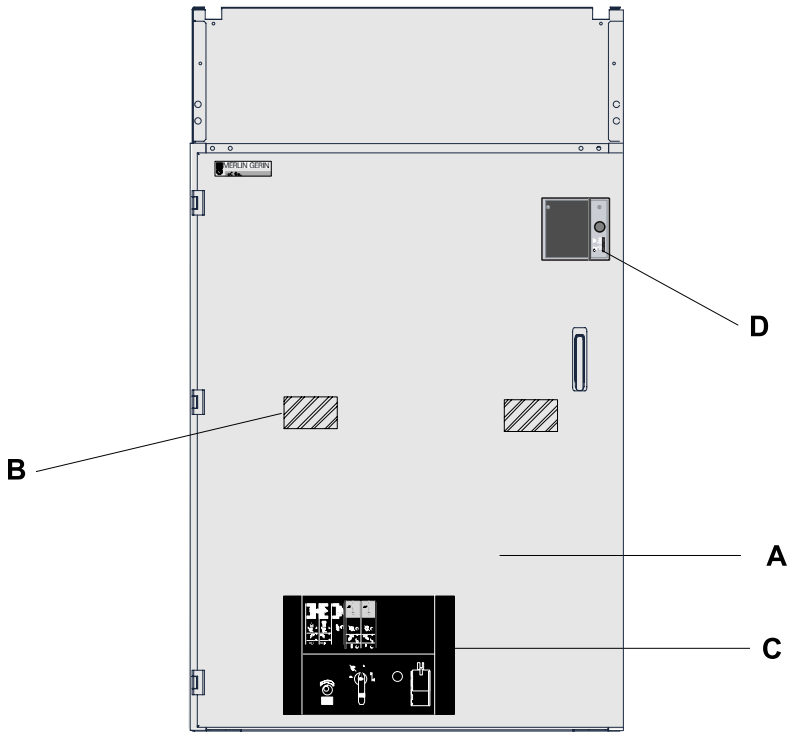
Abbreviations

CT: Current Transformer or current sensor
LV: Low Voltage
MALT: Mise A La Terre *(earthing)*
MV: voltage class from 25 to 36 kV
NVC: No-Voltage Check
SF: range of SF6 circuit-breakers used in the F400 cradle
SMALT: Sectionneur de Mise A La Terre *(earthing isolator)*
VT: Voltage Transformer

Standard M1 cradle

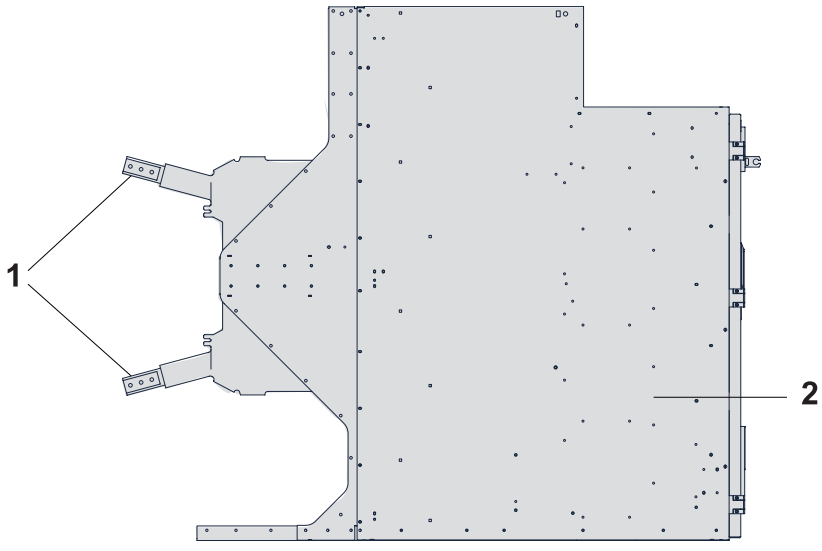
Front side

A: removable part compartment access door
B: removable part position check view ports
C: removable part interlocking and operating plate
D: removable part blocking



Left-hand view

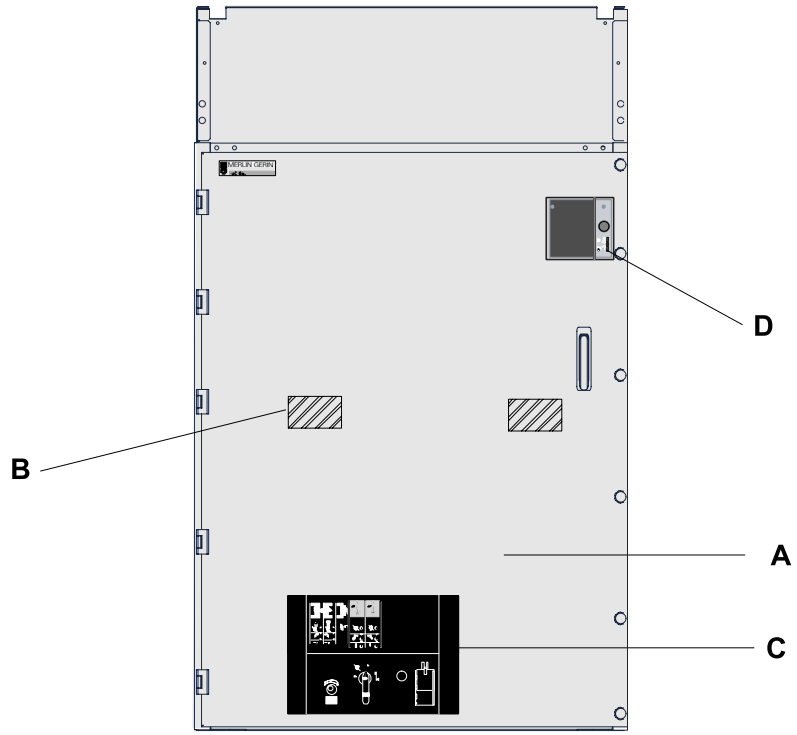
1: MV connection
2: removable part compartment



M1 internal arc protection cradle

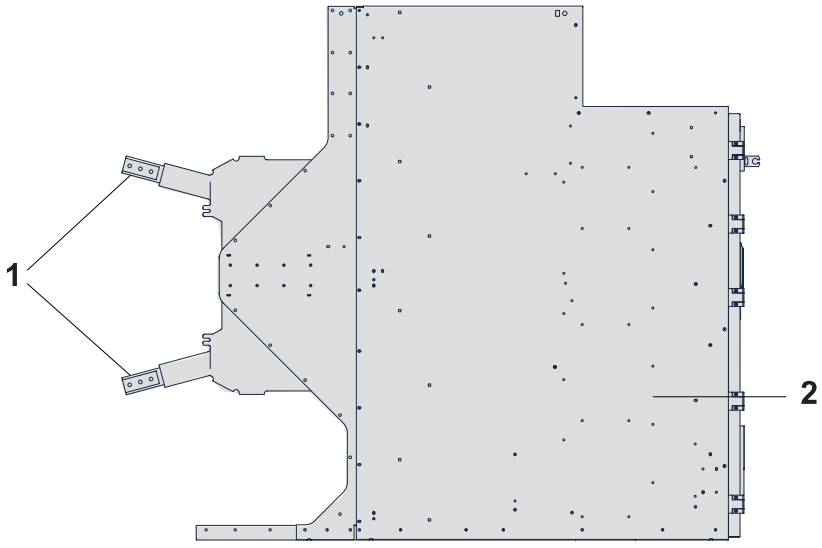
Front side

A: removable part compartment access door
B: removable part position check view ports
C: removable part interlocking and operating plate
D: removable part blocking



Left-hand view

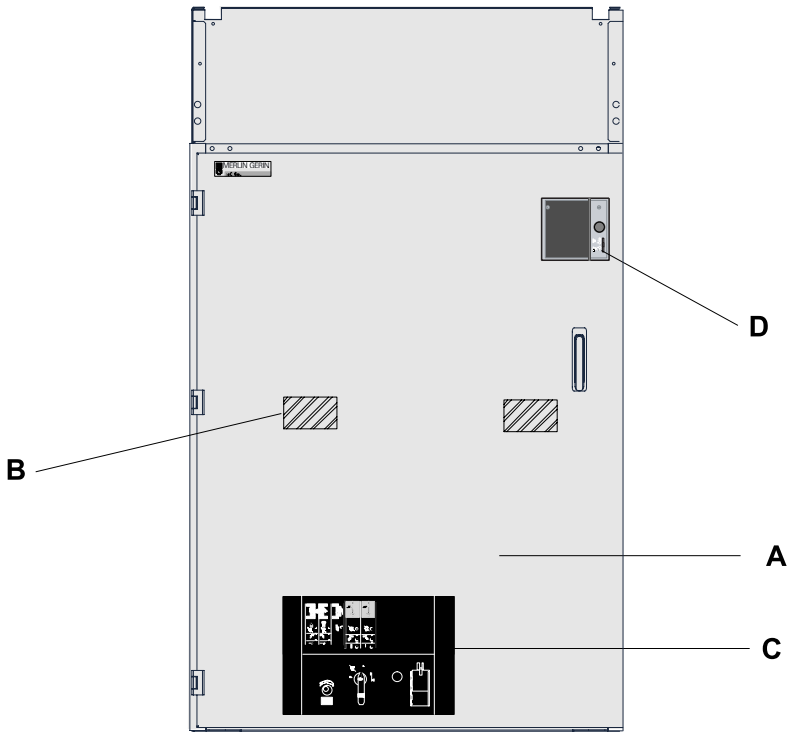
1: MV connection
2: removable part compartment



Standard M2 cradle

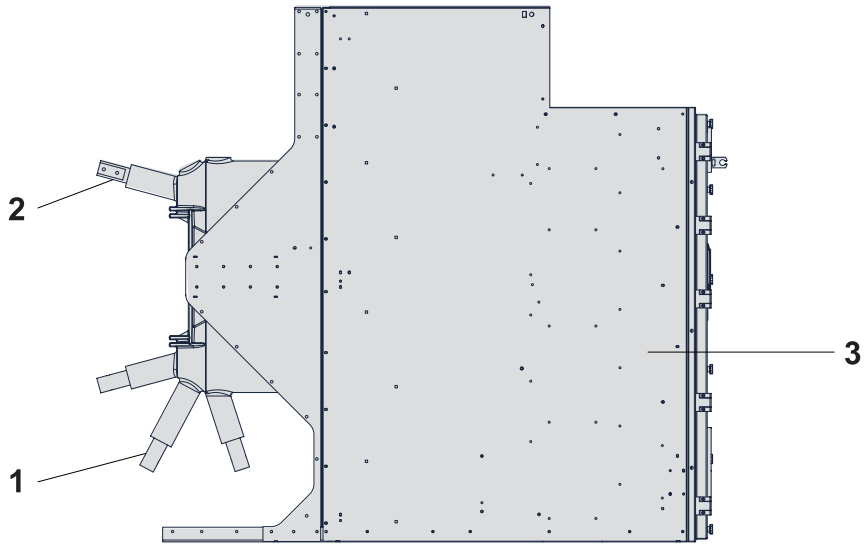
Front side

A: removable part compartment access door
B: view ports
C: removable part interlocking and operating plate
D: removable part interlocking plate



Left-hand view

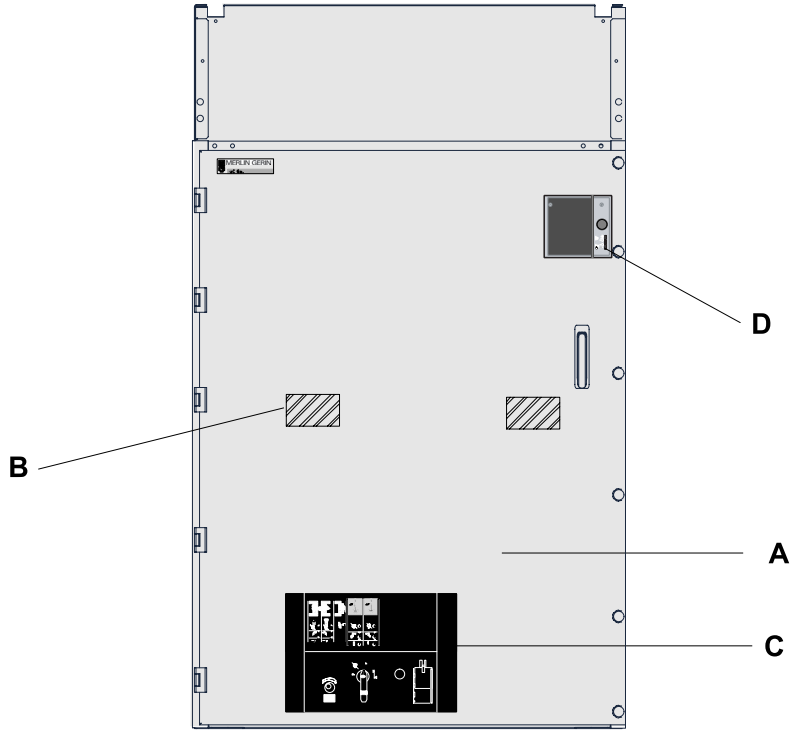
1: busbar compartment
2: MV connection
3: removable part compartment



M2 internal arc protection cradle

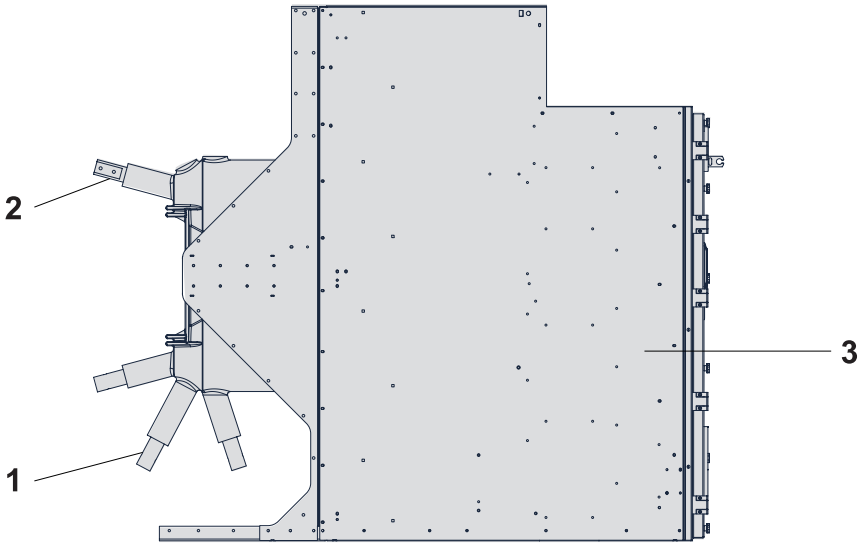
Front side

A: removable part compartment access door
B: view ports
C: removable part interlocking and operating plate
D: removable part interlocking plate



Left-hand view

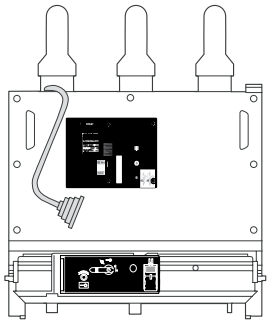
1: busbar compartment
2: MV connection
3: removable part compartment

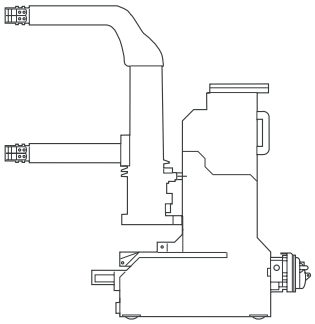


Standard draw-out SF circuit-breakers

SF1

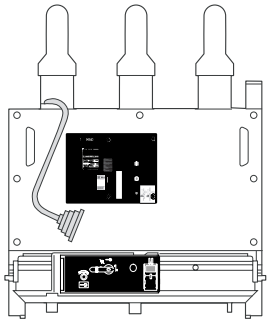
CEI 1250 A standard

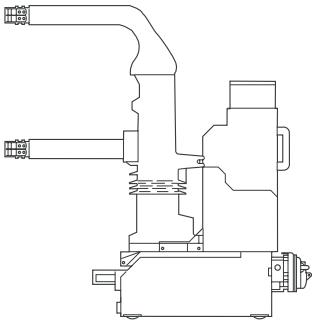




SF2

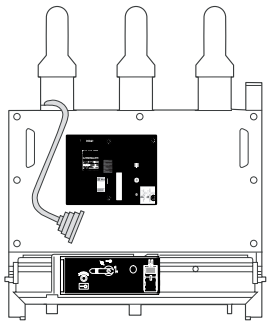
CEI 1250 A standard

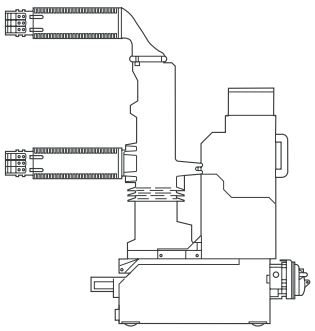




SF2

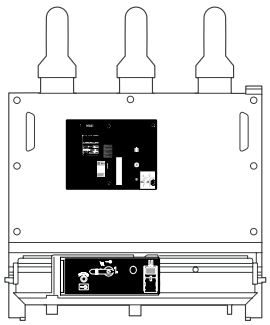
CEI 2500 A standard

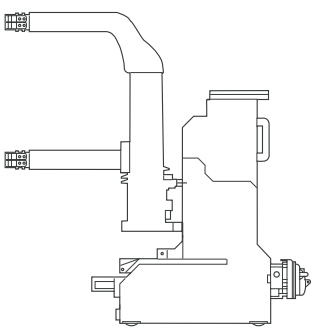




Standard draw-out bar bridge

1250 A and 2500 A

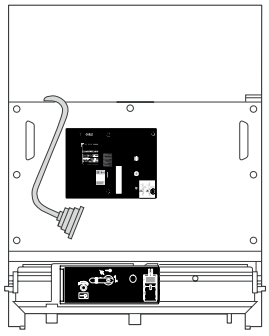


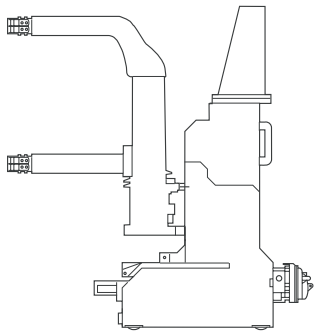


Internal arc draw-out SF circuit-breakers

SF1

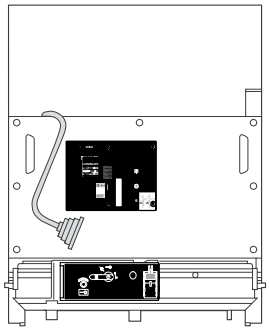
CEI 1250 A standard

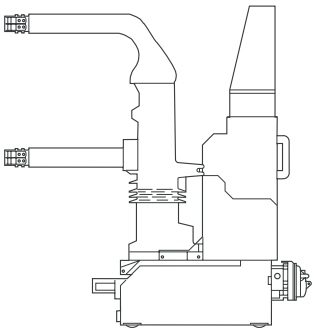




SF2

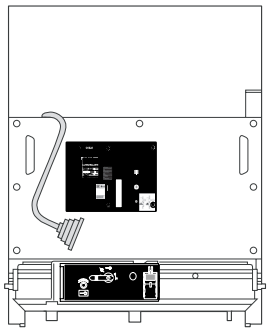
CEI 1250 A standard

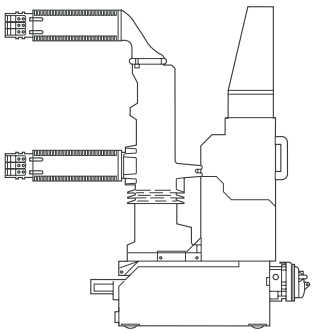




SF2

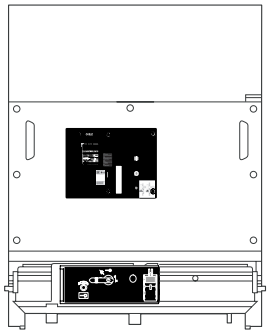
CEI 2500 A standard

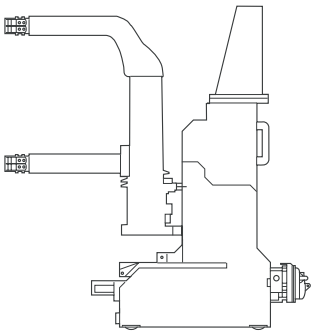




Internal arc draw-out bar bridge

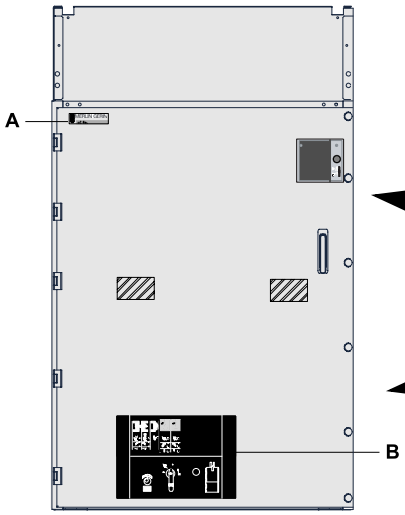
1250 A or 2500 A





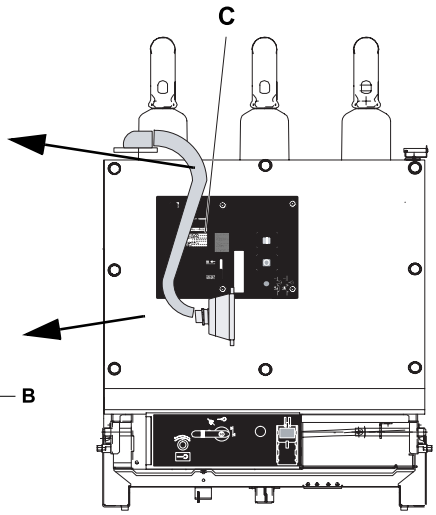
Identification

Functional unit



A: nameplate
B: features, descriptions and serial number

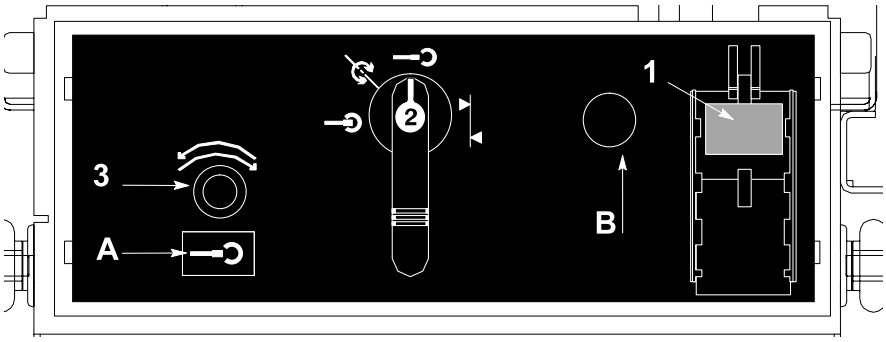
SF draw-out removable part



C: features, descriptions and serial number

How to read the information on the front side

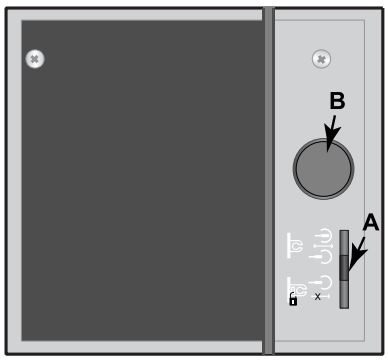
Removable part



1: mechanical opening push-button
2: removable part position selector
3: removable part operating crank insertion aperture

A: removable part mechanical position indicator
B: **slot for the disconnecting truck lock (optional)**

Plug-in disabling

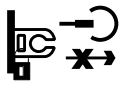


A: locking pull for plug-in disabling (plug-in disabling selector)
B: slot for the plug-in disabling lock

Symbols

Cradle

"Plug-in disabling" position

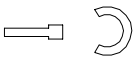


"Padlockable" position

Removable part

"Operating" position

"Drawn-out" position



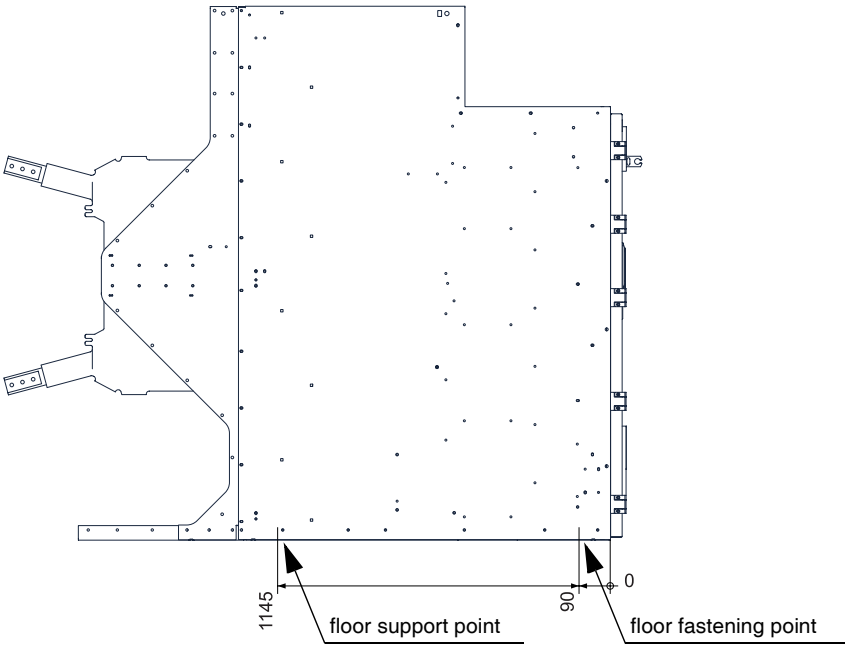
"Plugged-in" position

"Insertion/extraction" position

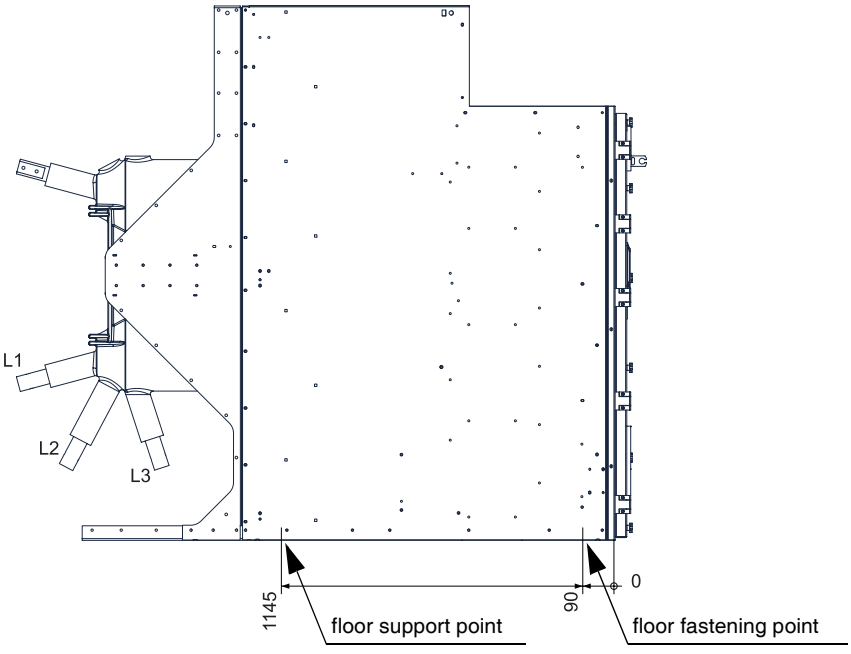
Floor mounting

This step will help to define your civil engineering basis.

M1 cradle



M2 cradle



Plug-in check on the operating site

Whenever a cradle has been fastened to the floor, use the circuit-breaker to check that plug-in and interlocking as well the opening and closing of the flaps are performed correctly.

To insert and plug in the removable part and close the door, refer to "**Operating Instructions**", section "**How to insert the removable part**".

Electrical connections

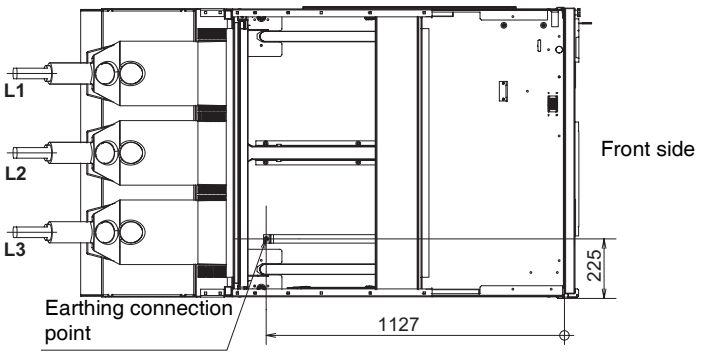
Screws, bolts and tightening torque

Note: *all the necessary screws and bolts are supplied, except for the MV cable connection.*

Screws and bolts to be used
Bolt joint for MV and LV indoor equipment.
Class 8.8 as per Standard ISO 225, i.e. yield strength, Re ⩾ 627 Nm/mm2
The screws and bolts must not be lubricated.
Tightening torque
Connections must be tightened
by means of a torque wrench, complying with the following torques:
Application method
The force of the bolts tightened to the recommended torques is better distributed thanks to the use of spring washers located on the outer surfaces of the terminal pads and busbars.
If disassembly is performed, replace spring washers.

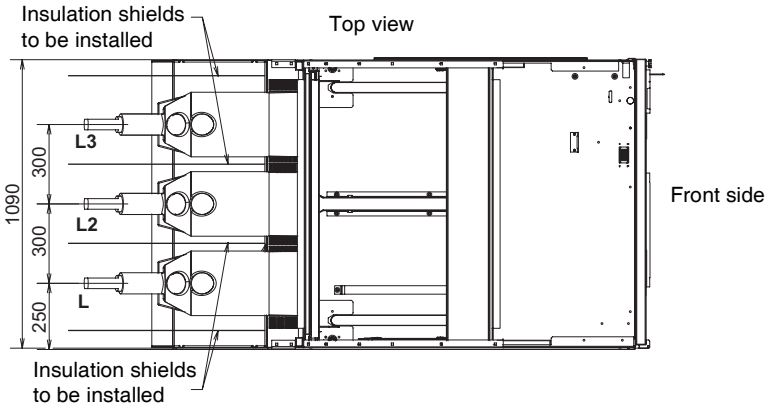
screw	torque in Nm
ø 6	13
ø 8	28
ø 10	50
ø 12	75
ø 14	120

Connection of the earth bar



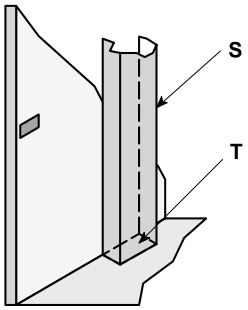
Insulation

Warning: dielectric insulation shields are not supplied

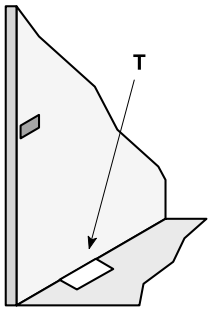


Connection of Low Voltage cables

S: trough
T: aperture



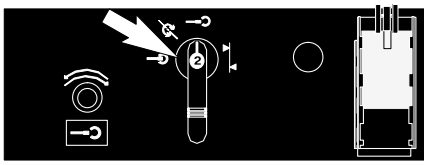
Through the bottom of the removable part compartment of each cradle, with trough **S** and aperture **T** communicating with the duct.
Max. quantity of cables: 8



Multicore cable ø 20 mm
To have access to aperture **T,** remove trough **S** cover.

How to extract the removable part

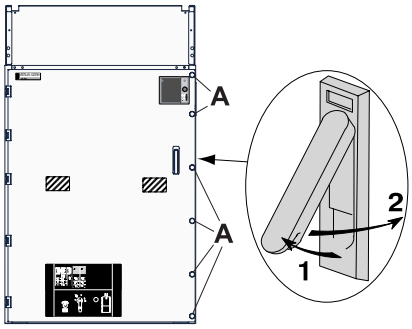
Initial status



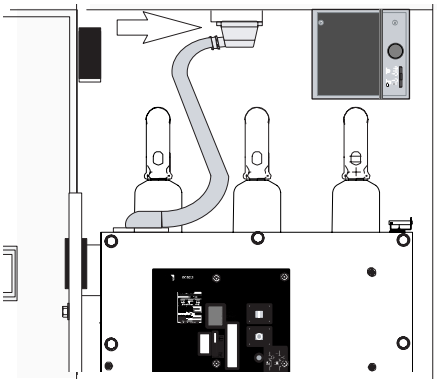
Removable part
- The removable part is drawn out.
- The cradle is in disconnected position.

Operation

Warning: for cradles with internal arc withstand option, loosen the 6 screws **A** before operating the handle

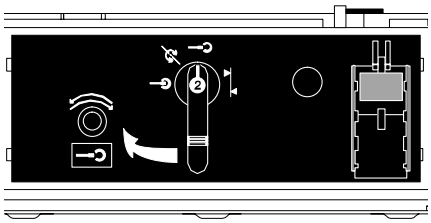


Open the access door to the removable part by pulling and then rotating the handle rightwards.



Unplug the LV auxiliary connection cord. Clip the cable on the circuit-breaker.

Warning: the threshold bar must be removed before extracting the removable part.



Move selector **2** to  then extract the removable part by pulling the handles.

Warning: to remove the threshold bar, loosen the nuts on top of it.

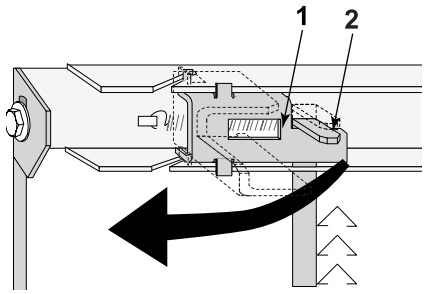
threshold bar

Pull out the removable part.

Closing the door after extracting the removable part

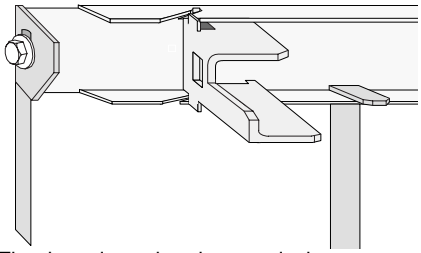
Warning: the following steps MUST be followed to allow the door to be closed.

Before closing the access door to the removable part, lower the panel.

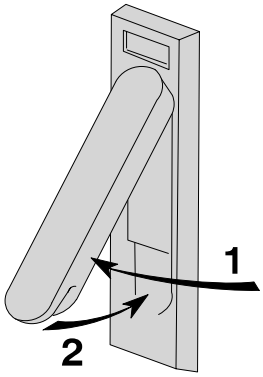


Inside the door, pull locking part **1**. Rod **2** goes down.

Warning: put back the threshold bar.

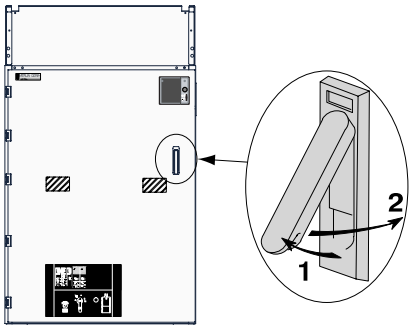


The door closes but does not lock.



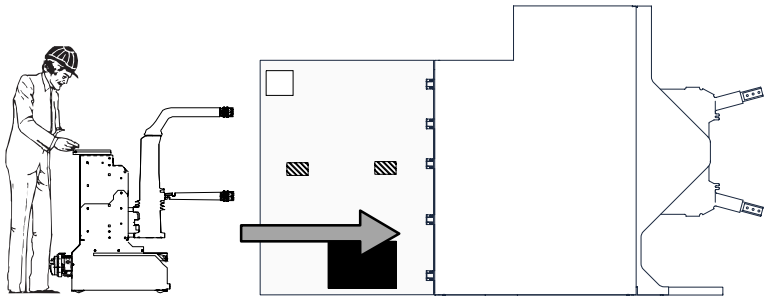
Close the door.

How to insert the removable part

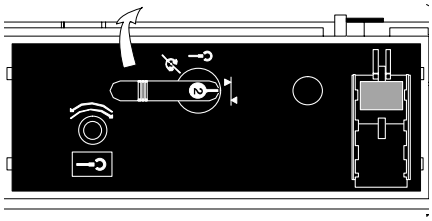


Open the access door to the removable part by pulling and then rotating the handle rightwards.

Warning: remove the threshold bar.

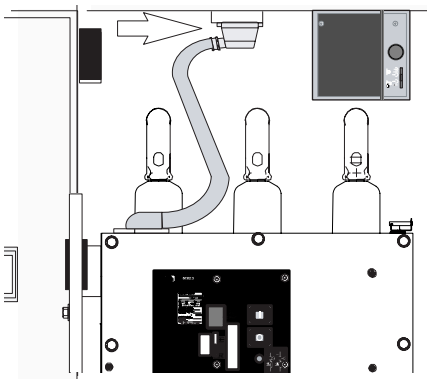


Insert the removable part in the cradle.



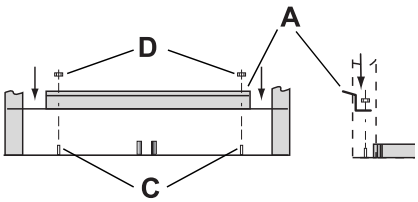
Move selector **2** to .

Push the removable part into the cubicle until its is in abutment then move selector **2** back to position .

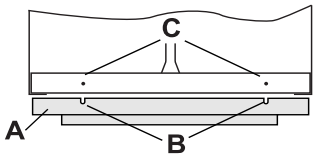


Connect the LV auxiliary connection cord.

Putting back the threshold bar



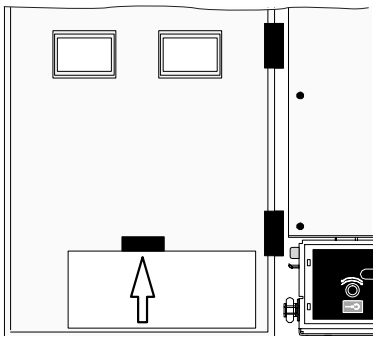
Insert the threshold bar **A** tilting it slightly, align slots **B** with threaded rods **C**, then fit the threshold bar.



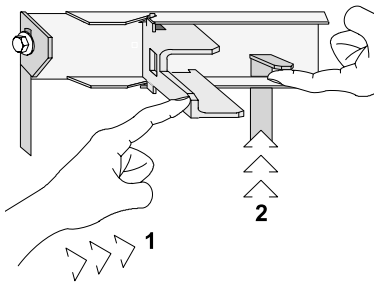
Loosen nuts **D**.

Closing the door with the removable part in place

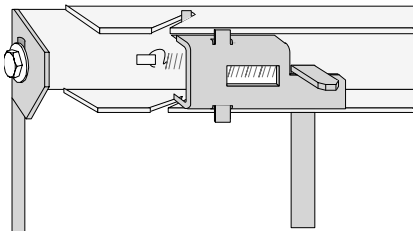
Warning: if closing is impossible, check the following points given in **E** and **F**.



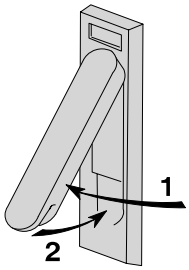
E: Before closing the access door to the removable part, lift the panel and check that it is properly latched at the top.



F: Lift rod **2**, topple locking part **1** over and release rod **2**.



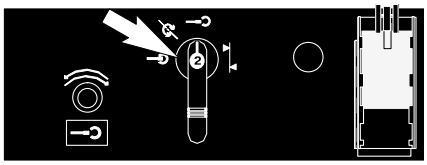
The door closes but does not lock.



Close the door.

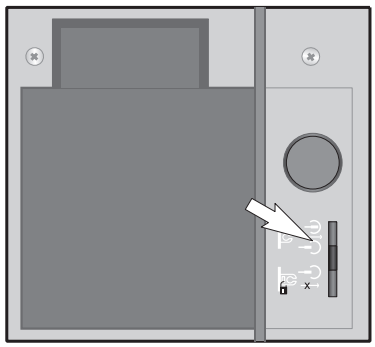
How to plug in the removable part

Initial status

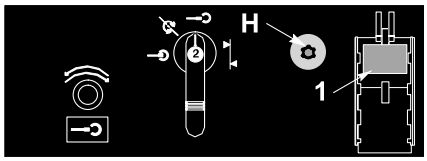


Removable part

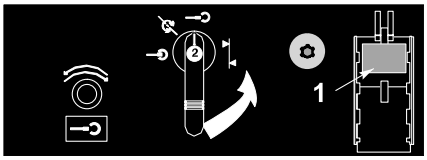
- The removable part is drawn out.
- Operation should be allowed by means of the locks, if fitted.
- The circuit-breaker LV auxiliaries are connected and the circuit-breaker compartment door is closed.



Operation

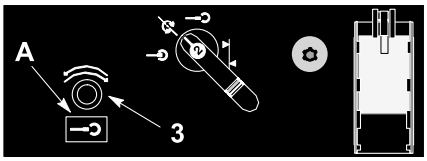


If it is key-locked: insert the key in **H**.
Lower the protection flap of push-button **1**.

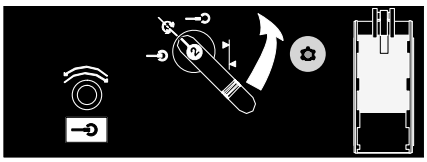


Press push-button **1**. Hold it down to move selector **2** to position  .

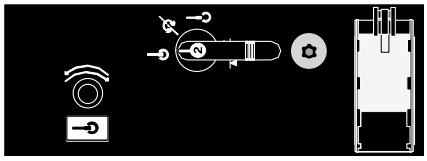
Lift the protection flap of push-button **1**.



Insert the crank in aperture **3**.
Plug in the removable part by rotating the crank clockwise until status change of position indicator **A** and locking of crank in rotation.



Move selector **2** to position  .

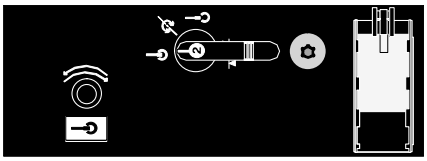


The removable part is plugged-in.
If a circuit-breaker is used, the electrical operation for switching on the downstream part of the equipment is now possible.

Final status

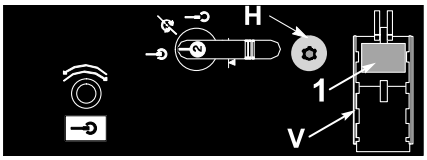
How to draw-out the removable part

Initial status

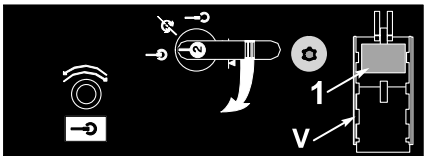


Removable part
- removable part in plugged-in position.

Operation



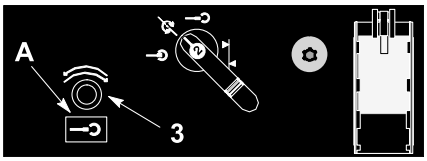
If it is key-locked: insert the key in **H**.
Lower the protection flap **V** of push-button **1**.



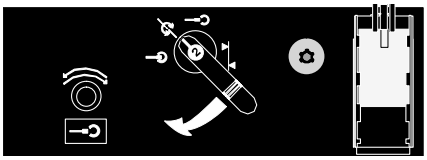
Press push-button **1** (which triggers a circuit-breaker mechanical opening order).
Hold it down to move

selector **2** to position  .

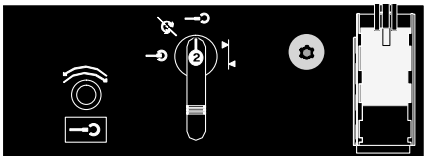
Lift protection flap **V** of push-button **1**.



Insert the crank in aperture **3**.
Draw out the removable part by rotating the crank counter-clockwise until status change of position indicator **A**.



Move selector **2** to position  .



The removable part is drawn out.
The cubicle is in disconnected position.

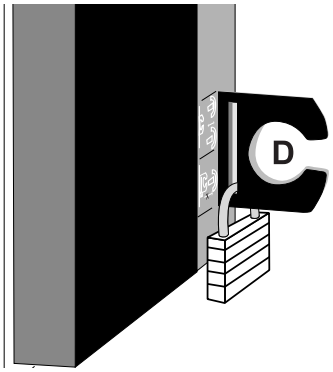
Final status

Padlocking

Padlock with ø 6 to 8 mm can be used

- on the plug-in disabling selector,
- on the protection flap of the removable part mechanical opening push-button,
- on the flap opening mechanisms inside the removable part compartment,
- on the adjustable voltage transformer operating mechanism.

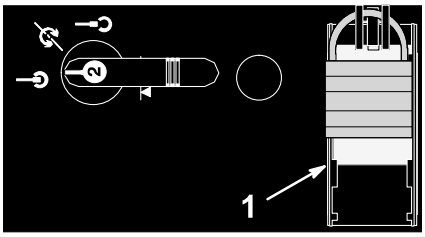
Disabling the removable part plug-in



Fit 1 to 3 padlocks on plug-in disabling selector **(D)** in the following position

Disabling the mechanical opening order of a circuit-breaker in operation position

This device can also be used as an additional plug-in and draw-out disabling system.



Fit a padlock on the protection flap of mechanical opening push-button **1**.

Opening the flaps

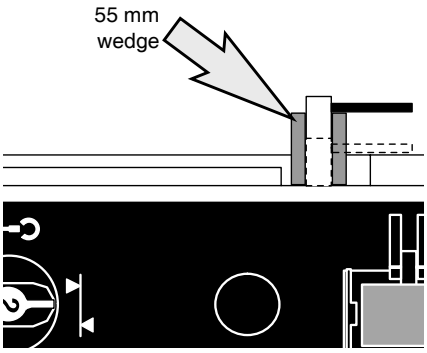
Refer to "**Maintenance Instructions**", section "**Access to upper and lower plug-in blocks**".

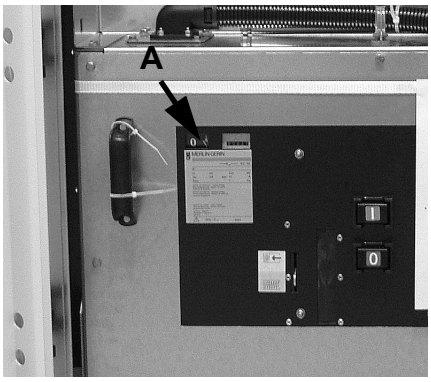
Operating the adjustable VT

Refer to "**Adjustable voltage transformer**", section "**How to operate the adjustable voltage transformers".**

Switchboard dielectric test

This test can be performed in a single operation.
All circuit-breakers must be plugged-in and closed, with the cradle doors open.
Furthermore, one of the outgoing cradles must have its MV cable compartment open for the connection of the test cable.

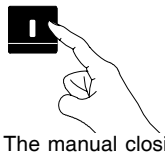




This preparation requires the manual disabling of interlocking to plug in the circuit-breakers, with the door open.

The sequence below must absolutely be followed.

Position the circuit-breaker in drawn-out position, with the door open.
Lift and lock the door locking rod by means of a 55 mm high U-shaped wedge.
Plug in the circuit-breaker.
Remove the wedge.



The manual closing of the circuit-breaker by pressing button "**I**" is then possible by means of its mechanical control.

Indicator **A** indicates the status of the circuit-breaker ("**O**" or "**I**").
The test can be performed.

Testing the current transformers

Injection at primaries
An injection at the current transformer primaries is possible by access to the fixed plug-in blocks located in the circuit-breaker compartment.

Injection at secondaries
The tests and settings will be preferably performed by injection at secondaries, using the test and injection boxes provided in the LV compartment.

Warning: the connection accessory must not damage the fixed block coating.

1: Extract the removable part.
2: Close the earthing isolator
3: Padlock the opening of the lower flap providing access to the fixed blocks on the busbar side.
4: Access the fixed blocks on the current transformer side through the upper flap opening.
5: Fit the injection device between the fixed block (primary terminal P1) and the cubicle earth bar which can be accessed in the circuit-breaker compartment. Terminal P2 of the transformer is connected to the cubicle earth bars by means of the earthing isolator in closed position.

Changing the winding ratios at the secondary.
Any change in the winding ratio is performed by access to a specific terminal board inside the low voltage compartment (see LV developed diagrams).
This operation is performed with the transformer primaries de-energized and earthed by closing of the earthing isolator.

After testing
1: Remove the injection device.
2: Close the upper flap.
3: Remove the padlock blocking the opening of the lower flap.
4: Open the earthing isolator
5: Insert the removable part.

Busbar earthing truck

The earthing of the Fluair 400 cradle busbar is provided by means of a circuit-breaker-type truck.
All circuit-breakers in the switchboard can be extracted if necessary.
Busbar earthing truck F400 complies with the requirements of standard NFEN 60129.

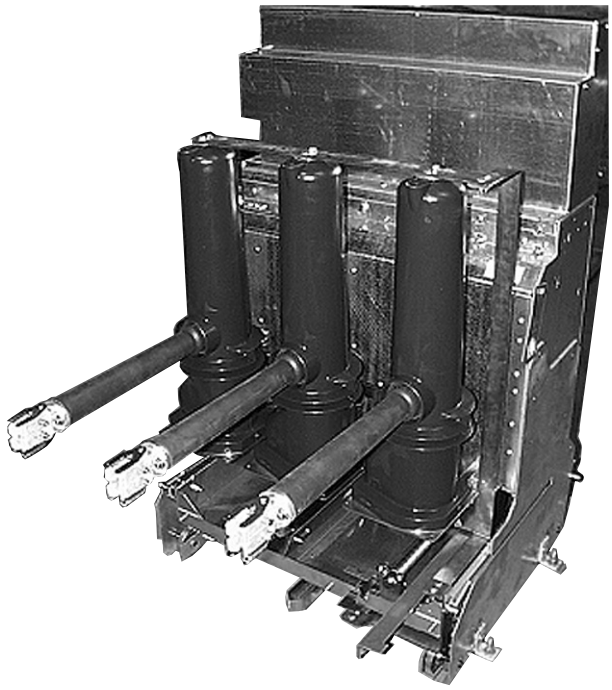
Technical features

Rated voltage = 36kV	
Ith = i.e.	25kA - 3s
Ith = i.e.	31,5kA - 3s
"Power on" device: no	

The MALT trucks are planned to be inserted in a 1250A cradle on the switchboard for the main earthing of the busbar.

A double lock can be provided with separate operating mechanisms releasing cams that abut the polarization block located on the cradle floor.

Each double lock is then allocated to one of the ½ sets of cubicles (L-H or R-H) by means of a central key box.



Polarization of MALT trucks
The purpose of this optional device is to impose the draw-out of all circuit-breakers in a ½ set of cubicles and of the coupling before plugging in a busbar earthing truck

Recommendations for operating MALT trucks
The plug-in of a MALT truck is performed by means of the propulsion mechanism used for circuit-breakers (crank).

The closing-opening operations of the main contacts are performed manually by the operator, with the cubicle MV door open.

The MALT truck is used in the following conditions:

- possibility of plugging in the MALT truck with the cradle MV door open or closed
- the MALT truck only operates the lower flap of the plug-in bells
- the truck operates the plug-in/draw-out contacts of the cradle
- the positioning of closing springs is performed manually by means of the lever
- opening-closing operations are controlled by means of the buttons located on the front panel of the truck
- the "O-C" buttons are padlockable separately
- the truck can be inserted with the earthing isolator (SMALT) closed or open
- the SMALT remains operable with the MALT truck plugged-in
- the MALT truck is equipped with a separation prohibiting access to energized parts when the truck is plugged-in

Once plugged in, the MALT truck is considered as potentially closed.

As a result, it does not have the following auxiliaries:

- auxiliary contacts indicating the status of the MV main contacts
- electric control systems to ensure the remote opening-closing controls

The "O-C" position mechanical indicator of HV contacts is:

- black for OPEN
- white for CLOSED

Ordering parts

When preparing the order, refer to this manual supplied with the system to define the equipment desired very precisely.

To order any equipment, you must indicate:

- type of cradle,
- manufacturing number (engraved on the identification plate located on the left-hand panel of the removable part compartment).
- If possible, attach a diagram of this manual on which the part is conspicuous.

Preventive maintenance

Before performing any task, make sure of the strict compliance with operating and safety instructions.

Our equipment is designed to guarantee optimum operation provided that the maintenance instructions described in this manual are strictly adhered to.

Start each maintenance task with the thorough cleaning of the cradle.
The use of pressurized solvent projection as a cleaning process is prohibited.

Warning: Schneider Electric cannot guarantee the durability and reliability of the equipment subjected to this type of cleaning process, even if followed with lubrication.

The main risks related to this process are as follows:

- de-lubrication of sliding rails and joints (life lubricated),
- corrosion of unprotected parts,
- damage and deformation due to high pressure,
- overheating due to solvent on contact areas,
- elimination of special protections.

Maintenance points

Removable part

Extract the removable part (refer to section "How to extract the removable part").
Referring to its user's manual, perform an overall check of the system.

Warning: should clamps be damaged, the corresponding MV fixed block in the cradle shall be inspected.
Warning: prior to any application, remove the old grease.

- Clean insulating parts.
- Apply a thin film of grease, "Kluber Amblygon TA 15/2" type or equivalent, to the plug-in clamps.

Removable part compartment

Extract the removable part.

Check and lubricate:

- pins and joints, mechanisms and sliding rails of flaps ("Kluber Isoflex Topas L152" or equivalent),
- the earthing plate ("Kluber Amblygon TA 15/2" or equivalent),
- behaviour at the LV wiring connection points.

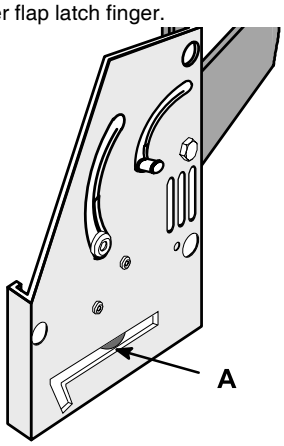
Warning: for electric contacts, do not use grease of "Kluber Isoflex Topas L152" type or equivalent.

Warning: prior to any application, remove the old grease. Remove dust and clean the inside of the compartment and the plug-in insulating parts.

Access to upper and lower plug-in blocks

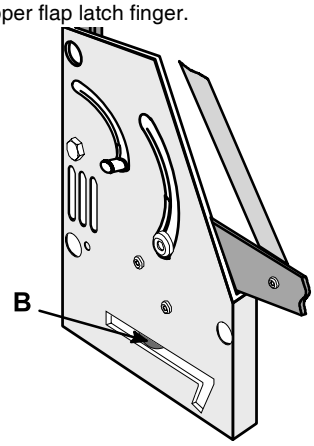
Opening the flaps

Left-hand side
A: lower flap latch finger.



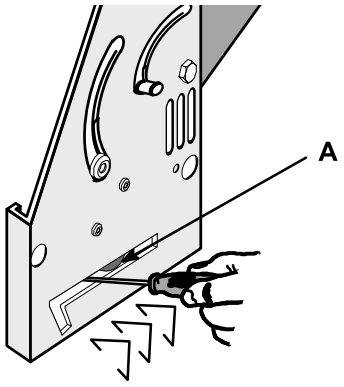
The plug-in blocks are accessed by manual opening of the lower flap:
- on the busbar side, in an incoming/ outcoming cubicle,
- on the left-hand busbar side, in a circuit-breaker coupling cubicle.

Right-hand side
B: upper flap latch finger.

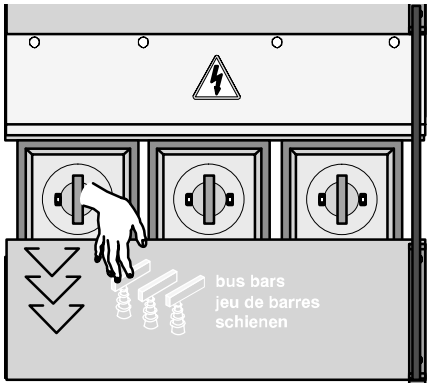


The plug-in blocks are accessed by manual opening of the bottom flap:
- on the MV cable side, in an incoming/ outgoing cubicle,
- on the right-hand busbar side, in a circuit-breaker coupling cubicle.

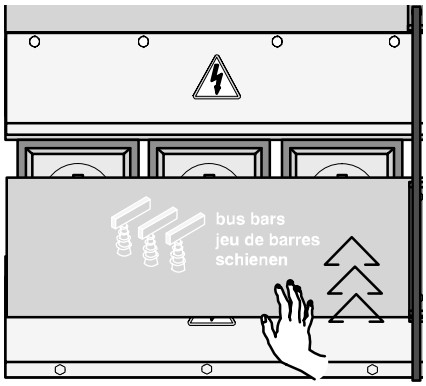
Left-hand side
Padlock the opening of the upper flap (refer to section "**Flap interlocking**").



Left-hand side
Using a screwdriver, release latch finger **A**.



Push to open the flap.

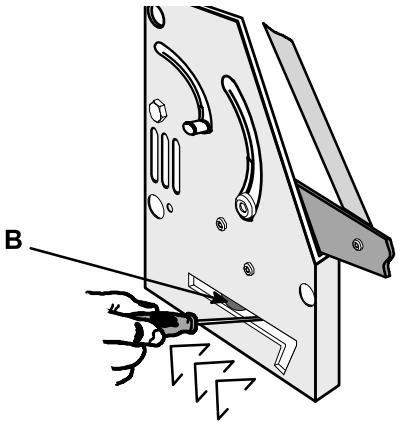


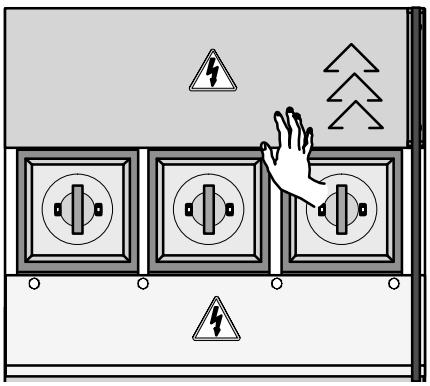
After maintenance, close the flap by lifting it manually until it locks, then remove the padlock locking the upper flap.

Operating the upper flap

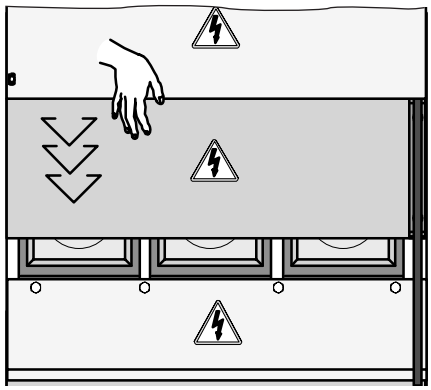
Right-hand side
Padlock the opening of the lower flap (refer to section "**Flap interlocking**").

Right-hand side
Using a screwdriver, release latch finger **B**.





Holding latch finger **B**, in position, push the flap upwards.



After maintenance, lower the flap manually until it locks, then remove the padlock locking the lower flap.

Trouble-shooting

Symptoms	Faulty devices	Possible causes and solutions
Abnormal noise with power on (crackling, vibrations)	■ insulators	Damp or dirty ■ clean or dry them
	■ metal components	Incorrectly fastened ■ check fasteners
	■ upstream or downstream connection	Incorrect cubicle connection ■ check the connections
Excessive overheating at connection points	■ connection	Connections incorrectly tightened ■ retighten them, see tightening torque, contact surfaces ill adapted or damaged ■ change or clean them
Operation requiring abnormal effort		Anomaly resulting from deformation ■ adjust
One of the "power on" Leds does not come on	■ Led	Abrupt handling, MV network overvoltage ■ change the "power on" block
	■ wiring	Faulty ■ check it (see wiring diagram)
	■ "power on" Led functional unit	Capacitor damaged ■ change the unit
	■ capacitor insulator	Insulator capacitor damaged ■ change insulator
Circuit-breaker does not close		Operation incomplete ■ refer to the removable part extraction chapter
	■ protection relay	Action of a protection ■ check the relay settings and remove the fault
	■ wiring	Faulty ■ check it by successive eliminations
	■ LV circuit-breaker	Faults on LV circuit ■ trouble-shooting by successive eliminations
	■ section switch	In "Out of operation" position ■ close it

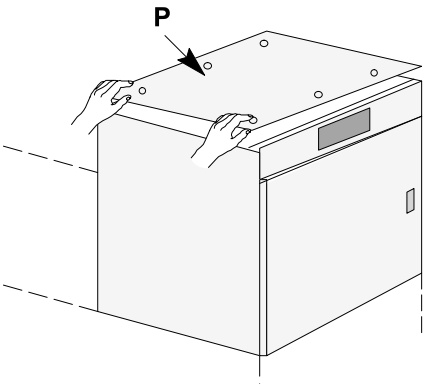
Mounting instructions

Refer to the plan provided with the LV compartment kit

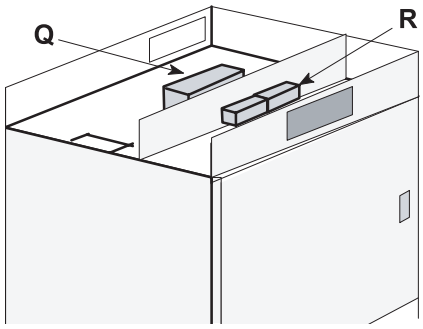
Connecting the LV cables

P: plate
Q: terminal block
R: terminal block
S: trough
T: aperture

Access to connection terminal blocks



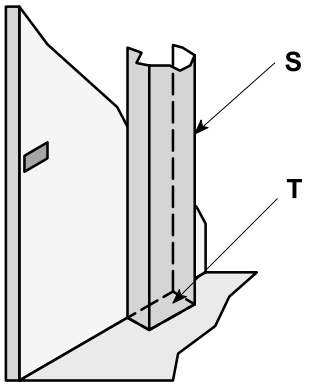
LV terminal blocks are located at the top of the LV compartment.
Loosen fastening screws and remove roof **P**.



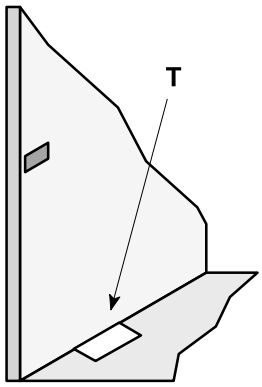
Q: connection terminal block
R: auxiliary supply earth bar terminal block

The Low Voltage wiring can enter the cradle in 2 different ways depending on the equipment.

1: Through the rear of the LV compartment.



2: Through the bottom of the circuit-breaker compartment of each cradle, with trough **S** and aperture **T** communicating with the duct.

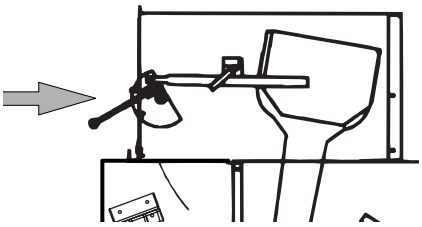


Max. quantity of cables: 8
Multicore cable ø 20 mm
To have access to aperture **T**, remove trough **S** cover.

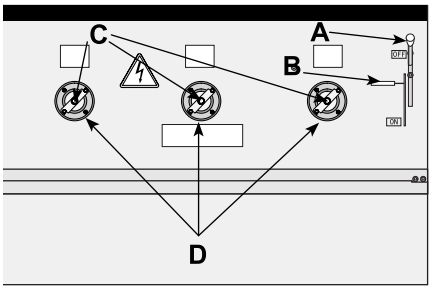
Mounting instructions

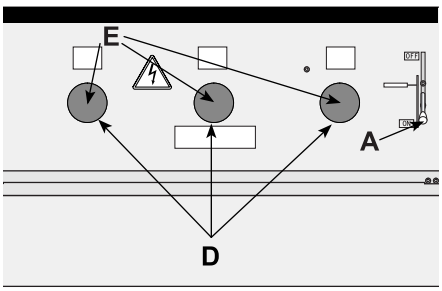
Refer to the plan provided with the VT compartment kit

How to operate the adjustable voltage transformers



Voltage transformers can be in the position "**in operation**" (primary fuses and transformers connected to MV cables or switchboard busbars) or "**out of operation**" (primary fuses and voltage transformers disconnected).

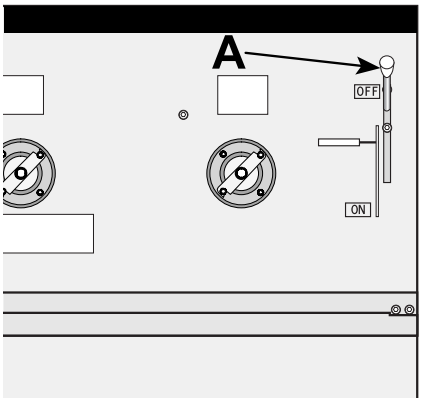


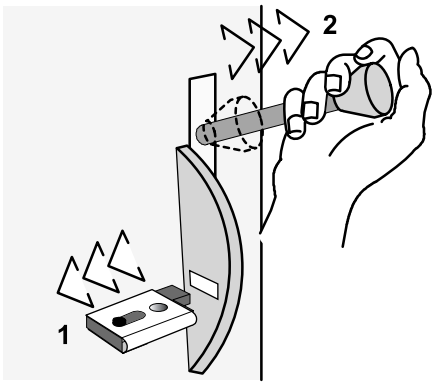


"Out of operation" position
A: operating handle in the top position
B: latch
C: fuse ends visible
D: fuse extraction slot

"In operation" position
A: operating handle in the bottom position
B: latch
D: fuse extraction slot
E: fuse slot retractable closing flap in closed position

How to put the VTs in operation



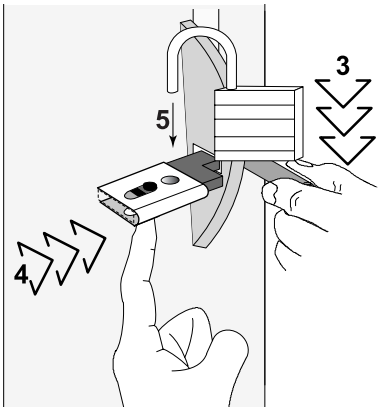


Initial status

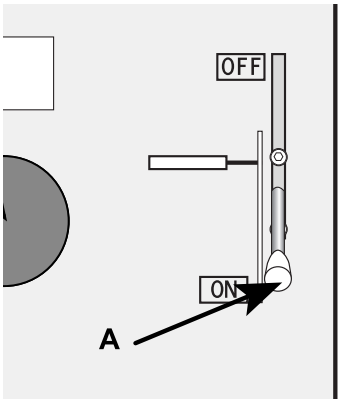
Handle **A** in top position, flap **E** open and fuse ends **C** apparent, indicate that the transformers are out of operation.

1: Push the latch to the left.
2: Pull the handle.

Adjustable voltage transformer

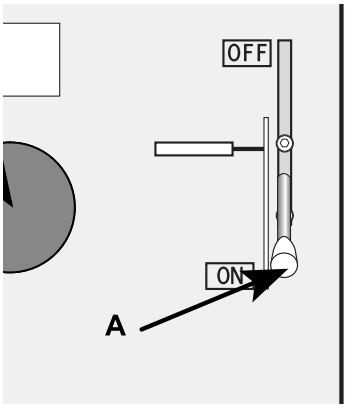


3: Lower the handle.
4: Block the assembly in position by pushing the latch to the right.
5: Lock with a padlock

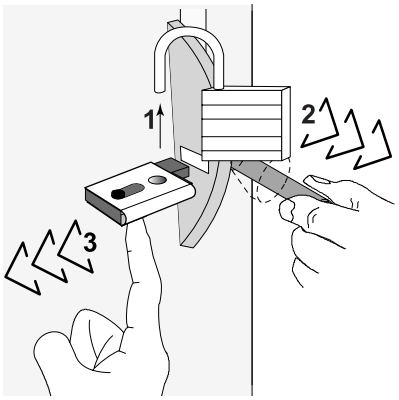


Handle **A** in bottom position and flap **E** closed, indicate that the transformers are in operation.

How to put the VTs out of operation

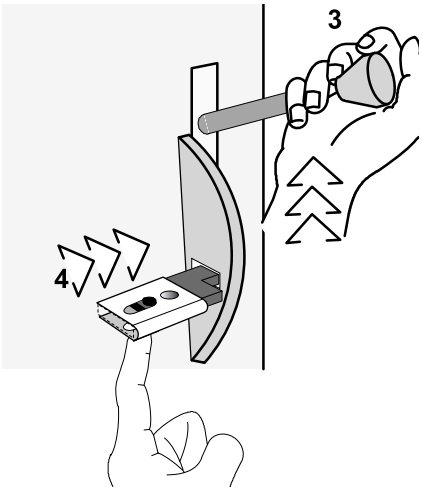


Handle **A** in bottom position and flap **E** closed, indicate that the transformers are in operation.

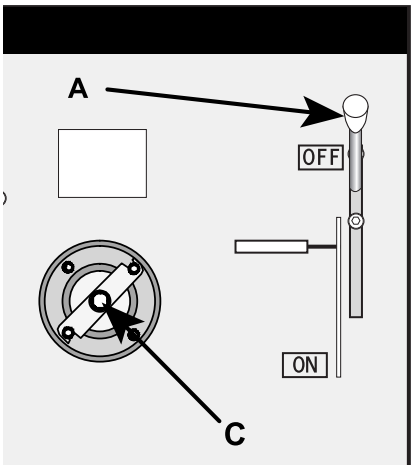


1: Remove the padlock.
2: Pull the handle.
3: Push the latch to the left.

Initial status



4: Lift the handle.
5: Block the assembly in position by pushing the latch to the right.

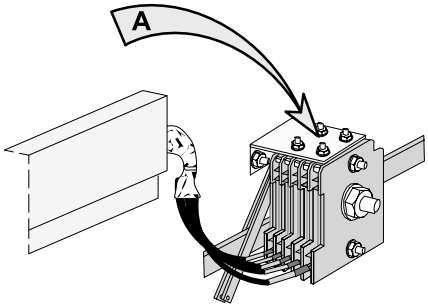


Handle **A** in top position, flap **E** open and fuse ends **C** apparent, indicate that the transformers are out of operation.

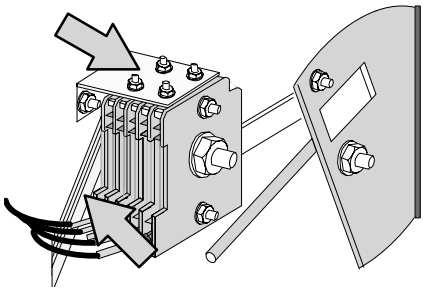
Replacing the VT position auxiliary contacts

Removal

Note: *to access the auxiliary contact block, remove the closing plate.*



A: auxiliary contacts



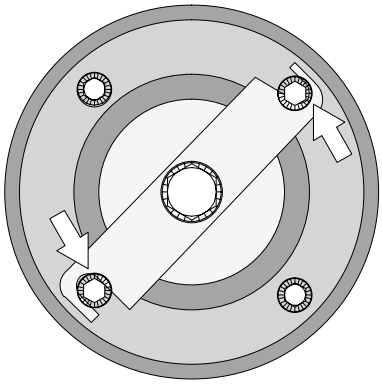
For the auxiliary contacts, separate the crank on the compartment side and remove the 4 mounting screws.

Fitting

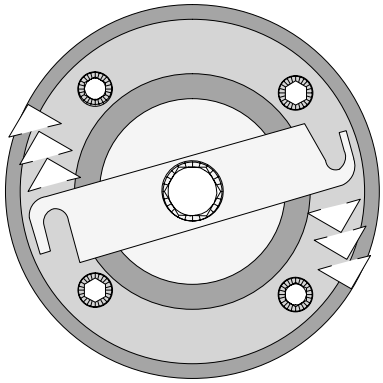
Proceed in the reverse order.

Replacing the fuses of the adjustable voltage transformers

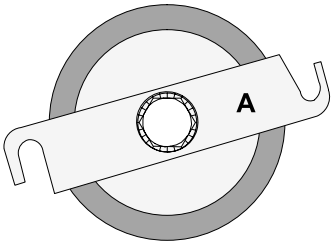
Put the VTs out of operation (refer to section "**How to put the VTs out of operation**").



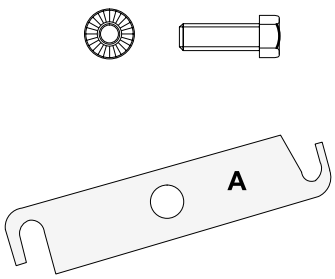
Release the two screws.



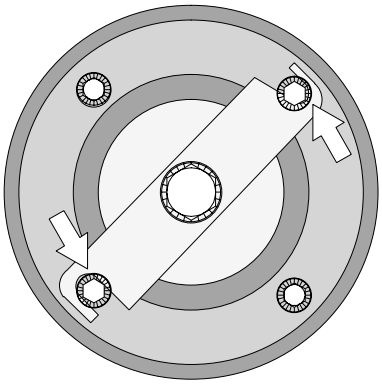
Rotate and remove the fuse.

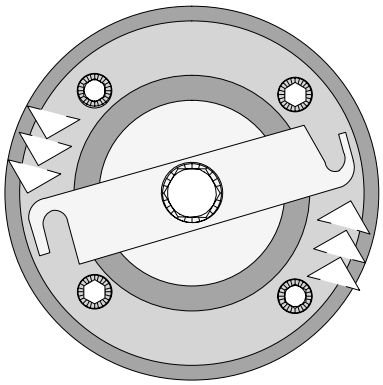


Remove the fasteners and bayonet **A** from the fuse...



... and fit them on the new fuse.



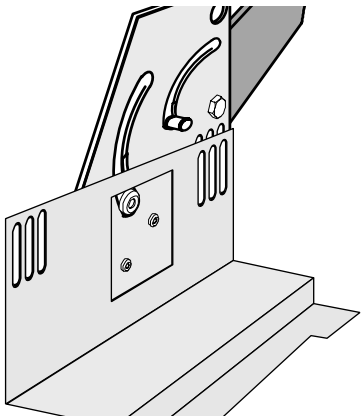


Fully insert the fuse and rotate.

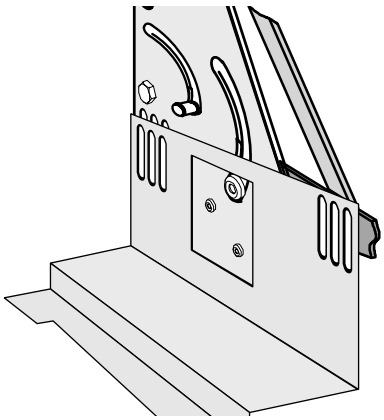
Lock the two screws to the recommended torque.
Put the VTs out of operation (refer to section "**How to put the VTs in operation**").

Interlocking the flap on the removable part compartment

Flap interlocking



Left-hand side
The plug-in blocks are accessed by manual opening of the lower flap:
- on the busbar side, in an incoming/ outcoming cubicle,
- on the left-hand busbar side, in a circuit-breaker coupling cubicle.

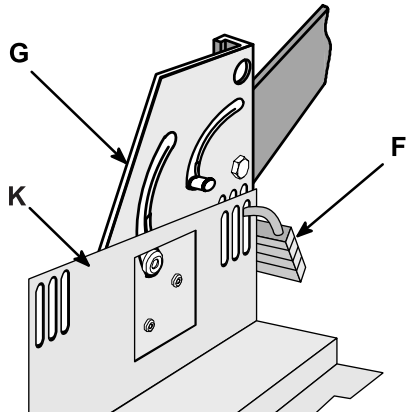


Right-hand side
The plug-in blocks are accessed by manual opening of the upper flap:
- on the MV cable side, in an incoming/ outgoing cubicle,
- on the right-hand busbar side, in a circuit-breaker coupling cubicle.

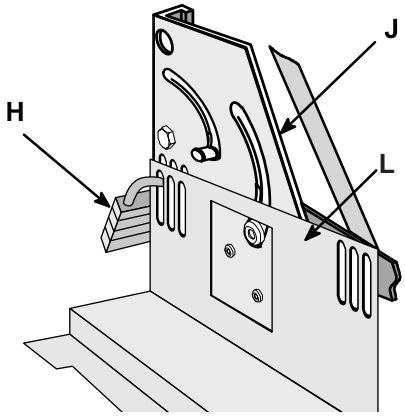
After the removable part has been extracted from the cubicle, the upper or lower flap can be locked by means of 1-2 or 3 padlocks.

1: Position the part (**K** and **L**),
2: padlock.

Note: *the 2 operating mechanisms are separate.*



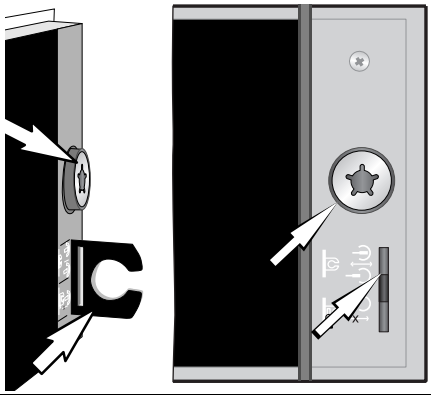
Left-hand side
F: padlocking
G: lower flap operating mechanism



Right-hand side
H: padlocking
J: upper flap operating mechanism.

Key-locking

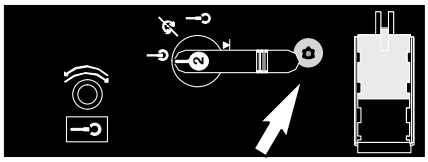
Disabling the plug-in of a removable part



Removable part in drawn-out position.
Remove the key when the plug-in disabling selector is in the following position: 

Draw-out is then impossible.

Disabling the draw-out of a removable part or of a disconnecting truck



Remove the key when selector **2** is in position  .

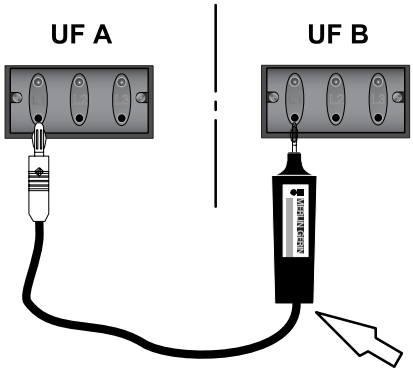
Draw-out is then impossible.

"Power on" device

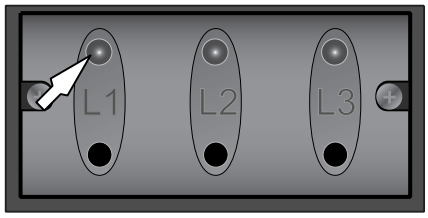
Testing "Power on"

As soon as the cables have been energized, the "power on" indicator Leds L1, L2 and L3 must come on.

Checking phase coincidence between two cradles



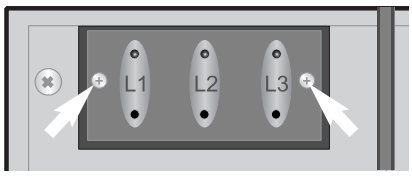
Phase coincidence:
the tester lamp does not come on.
Phase unbalance:
the tester lamp comes on.



Check that power is off.
The "power on" indicator Leds are off.
It is recommended to lock the tester in this position.

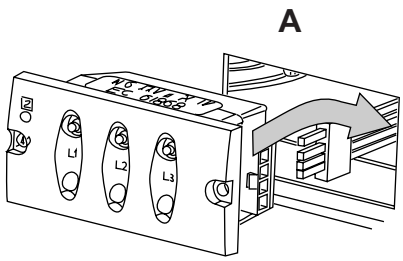
Replacing the "power on" Led block

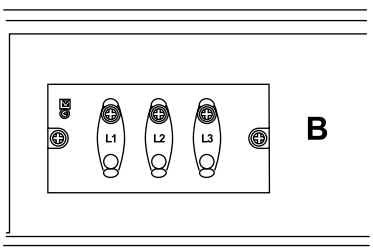
Removal



Mark and disconnect the wiring connector.
Remove the fasteners and free the "power on" Led block.

Fitting





Set the "power on" block according to the arrow direction (see above) and plug the connector in the rear side.
Tighten the 2 screws to a 0.1m daN torque.

Mounting the busbars

Warning: the bars and all the contact surfaces must be clean on mounting.

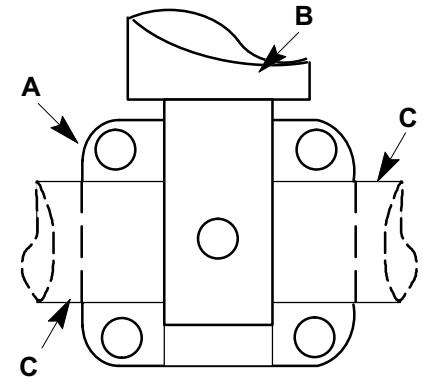
The kit is supplied in a separate parcel including the following parts:

- busbars,
- connectors and associated screws and bolts,
- insulating covers.

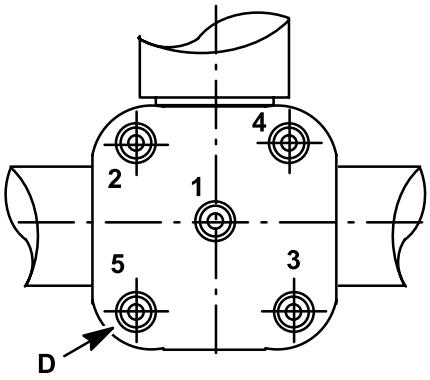
Intermediate busbars

A: connector half
B: bushing
C: bare or insulated bars
D: hex socket screw ø 14 + washer
E: cover half

Warning: the sequence of operations and tightenings MUST be complied with.



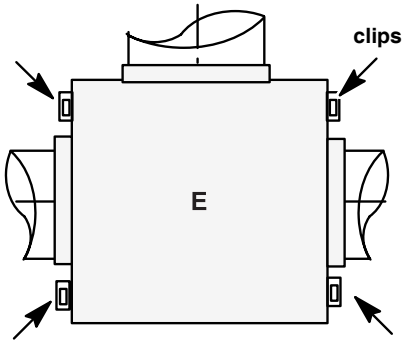
1: Assemble the bars and connectors and fit the fasteners



2: Bring up the screws and nuts to the limit stop in the order shown below, but do not lock them in position:
1-2-3-4-5

3: Using a torque wrench, tighten the screws in the order recommended above in 2 successive runs:

- 1st run to a **25** Nm torque,
- 2ndrun to a final torque of **75** Nm.



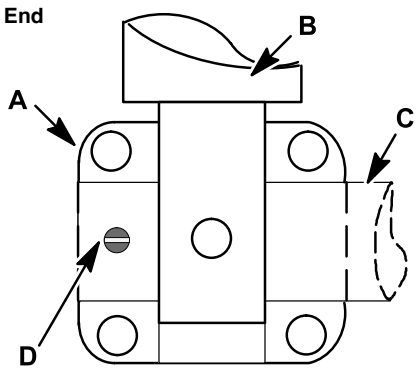
4: Assemble the 2 cover halves **E** by exerting pressure on clips.

End busbars

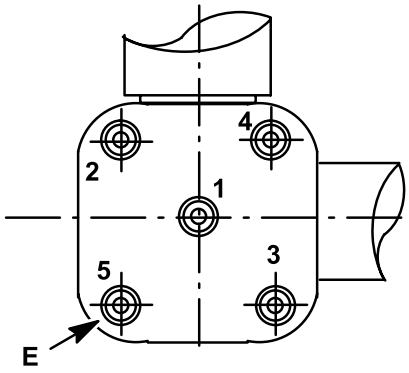
A: connector half
B: bushing
C: bare or insulated bars
D: screwed-on sleeve
E: hex socket screw ø 14 + washer
F: cover
G: binding

Warning: the sequence of operations and tightenings MUST be complied with.

Note: *in this case, a sleeve* ***D*** *is screwed onto a connector half.*



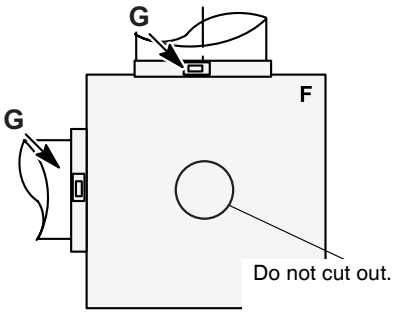
1: Assemble the bars and connectors and fit the fasteners



2: Bring up the screws and nuts to the limit stop in the order shown below, but do not lock them in position:
1-2-3-4-5

3: Using a torque wrench, tighten the screws in the order recommended above in 2 successive runs:

- 1st run to a **25** Nm torque,
- 2ndrun to a final torque of **75** Nm.



4: Fit the insulating cover **F** on the connector. Lock it in position by means of 2 plastic bindings **G**.

Maintaining the busbar compartment

Remove dust and clean the inside of the compartment and the insulators

Tightening torque
The connections must be tightened by means of a torque wrench, complying with the following torques:

screw	torque in Nm
ø 6	13
ø 8	28
ø 10	50
ø 12	75
ø 14	120

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